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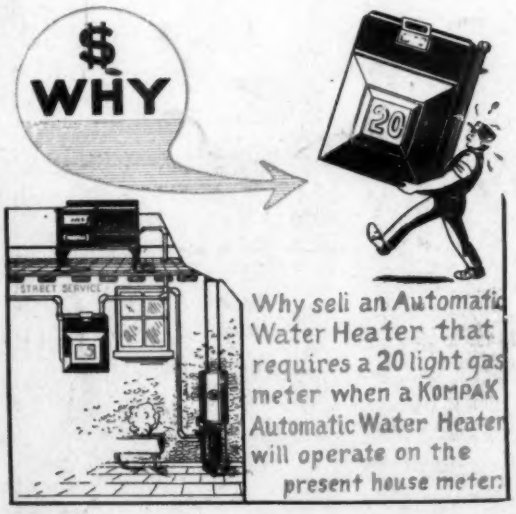
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Chicago By-Product Coke Company's New Plant

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Getting More Out of the Existing Plant

When Should the Replacement Unit Be Purchased?—A Wasteful Distributing Policy

By L. W. ALWYN-SCHMIDT

It is held against the American nation that it is wasteful in its habits and inclined to discard methods that have served well in the past simply because something newer has been discovered. There may exist a divergence of opinion whether a certain unit of equipment can produce a full 100 per cent efficiency after having been in use a certain number of years, but the fact remains that once this equipment has reached a certain point in its existence deterioration will come for a few years to a practical halt if the equipment is properly taken care of.

The economics of this process of lengthening the life of industrial equipment in the public utility industry, however, must be well understood, as nothing can be gained by retaining inefficient equipment in the productive organization merely on the chance that it is cheaper to continue its use than to purchase a new unit.

Every gas manager will agree that certain units of the equipment used in gas making are practically indestructible if properly taken care of, while there are others that need frequent renewal according to service and character of the unit.

The rate of deterioration of equipment, however, is of considerable importance to the gas works, as it determines also in part the income of the enterprise.

Take a gas works costing $1,000,000.

There is certainly a vast difference whether deterioration in this plant proceeds at a rate of 12 per cent every year or say at 6 per cent.

To bring down, therefore, the rate of deterioration is as important for the profitable operation of the works as would be the installation of labor-saving machinery or any other unit destined to lessen the cost of production.

The problem is one of keeping the cost of repair inside the radius of reasonable expenditure for replacement.

This question has already been widely discussed in technical circles without finding a really serviceable solution.

Let us take, for instance, any piece of equipment costing $10,000.

Such a unit of equipment can be expected to do good work at least ten years.

But with the approaching age it will lose step by step in productive efficiency until after eight years, for instance, efficiency may have declined to a point below which it is unsafe to continue the operation of the unit in the interest of economic operation of the whole.

If we assume that ten years will be the approximate life of this particular unit of equipment we would have to charge 8 per cent every year to guard against deterioration which would be an annual expenditure of $800.

It is assumed then that the unit is worth $800 less to the plant and the working efficiency of 8 per cent of its total 100 per cent of efficiency has been replaced by an addition of $800 to the repurchase fund. This in theory is correct, but in practice it works a little different.

A machine unit does not lose its full 8 per cent working efficiency during the first years, neither will it do so during the second and third. The dangerous age comes later.

But loss of efficiency progresses then more quickly. So it is sometimes doubtful whether a complicated unit of equipment has really a full 60 per cent efficiency left after five years of operation if extensive repairs have not been made in the course of that time and a certain amount was expended in maintenance.

In fact, it is certain that such a unit would fall much below 50 per cent in such a case.

It is, therefore, necessary not only to set aside a certain percentage of the capital value for the purpose of equalizing the financial loss caused by deterioration, but to give to the unit a certain amount of attention in the matter of repair. No repurchase fund of whatever size can protect the company against the loss of working efficiency of the unit.

The financial side of the problem has been considered already in an earlier article. In this case the question will be taken up in its effect upon the operation efficiency of the enterprise as deterioration affects the earning capacity.

Assuming that the unit has been in operation a matter of five years, and that it belong to that class of equipment which deteriorates quickly under the influence of operation wear and tear. Every complicated machine unit belongs to this group.

The company would then have set aside $4,000 or written off that amount allowing a deduction of $800 for every year of operation.

Theoretically the value of the unit has been reduced to 60 per cent of its normal purchasing value, leaving alone entirely the problem of rising cost of equipment, while 40 per cent of that working efficiency are represented by the $4,000 that should be placed to reserve or in a special repurchase fund.

The practice is very commonly followed and it seems to have worked well. How many gas managers, how-

ever, have considered whether the capital interest of the $4,000 is really a full compensation for the loss of efficiency in the equipment?

Naturally a unit of equipment costing $10,000 does not play a considerable part in a large gas enterprise. But one might as well apply the example to the operation status of the whole enterprise.

After five years of operation of a complete equipment and the writing off of 40 per cent for deterioration, what would be the correct earning power of that equipment?

If it would be 60 per cent only of its original earning power the remaining 40 per cent would not be covered by the interest on the repurchase fund even if the company would be able to get a 6 per cent interest on its money.

Maintenance Cost Real Test of Efficiency of Equipment

It is clear from this that the real test of the economic status of the enterprise does not depend from the accumulation of reserves, but from the amount that has to be spent annually for maintaining the equipment upon a 100 per cent efficiency. Or to express the problem in other words, to produce with the slowly deteriorating equipment the same quantity and at the same cost as would be the case with an entirely new equipment.

This creates a rather fine point of scientific management. Two principal questions arise:

How much is the management entitled to spend upon maintenance?

What can be done to get the full value out of the existing equipment?

Both problems deserve the most searching investigation.

To return to our equipment unit costing $10,000. An annual depreciation charge of 8 per cent assessed upon the basis explained in a former article will help the gas works to repurchase this unit of equipment after ten years, but it will not make it perform better work when once the point has been reached where it begins to lose its working efficiency.

So it becomes necessary to charge upon this particular piece of equipment an annual extra charge which is covered by the item maintenance in our balance sheets.

The purpose of this maintenance charge is to keep the unit at a working efficiency, sufficient to make possible its retention in the productive organization of the plant.

It follows that the maintenance expenditure must be kept in an equitable relation to the income of the enterprise and must not be higher than the value that is received by its expenditure.

Maintenance expenditure during the first years of the life of the equipment as a rule is slight. A coat of paint, the replacement of an exposed part, may be all that is required to keep the unit effective. With the progress of time the expenditure, however, increases. Two distinct problems will then arise. The one is financial, the other technical.

Maintenance of the unit may cost more than is justified by the income derived from its operation. The efficiency of the unit may decline to a point where it begins to hinder the efficient working of other units.

The management then must decide whether a thorough overhauling of the unit will bring it up to full efficiency and what the cost will be or whether the repurchase fund must be drawn upon to replace the unit by an entirely new one. The financial side of the question is comparatively simple. If the repair is cheaper than the purchase of a new unit it lies in the interest of economic operation that the unit be repaired and retained in the equipment. In this case the management makes an actual profit which must consist in the value of the repurchase fund accumulated from the deterioration charge against the unit less the cost of the repair.

The surplus in such a case might be charged to profit as it will recompense the works for any previous expenditures in connection with maintaining the efficiency of the unit. The economic correction of the transaction must be judged by the following consideration: Is the unit after repair again able to work at a 100 per cent efficiency for another period of ten years? If this is the case, and the managers themselves must be the judges, the repair no doubt is the more advisable. Assuming that only another five years of full efficiency can be had from the unit after thorough repair, in this case the repair may be preferable in the interest of economic operation, but the management would not be justified to transfer the whole of the surplus of the repurchase fund after the payment of the repair to the profit account. The loss of five years' working life would still have to be considered.

In each case the cost of maintenance must not exceed the possible earning power of the unit less the interest income from the repurchase fund.

Putting the Equipment to 100 Per Cent Use

So far the problem has been one of financial economy only. But to-day it is not merely a question of providing for the financial protection of the equipment of our gas enterprises but to buy this equipment at all. Prices of industrial equipment have risen so rapidly that it has become impossible for many gas plants to adjust their depreciation charge, and there are doubtless many cases where bankruptcy would face these enterprises if they should be compelled suddenly to add greatly to their equipment.

Before these companies, therefore, take up the very serious problem of purchasing additional equipment, they should study the more immediate question whether they are making really a 100 per cent use of the equipment they possess.

This special problem has found a great deal of attention in Europe during the war, and it deserves some consideration in our own case.

The European continental gas works saw themselves faced during the war by an enormous increase in the demand for new installations coming from industrial consumers which had to be supplied at any cost. During the same time a very serious shortage arose in the supply of equipment covering all the ground from generators to gas burners. Incidentally much of the existing equipment went out of actual use, because the owners of smaller factories closed down and a large part of the domestic equipment was not wanted any more. The German gas works started comparatively early to take this dead equipment and to put it to new use. Meters and lighting fixtures were removed from the old location and fitted elsewhere. It was objected against this practice that the equipment would have to be replaced in the future when the buildings were taken

in use again. But the supporters of the idea argued with some justification that it would be just as expensive to put new equipment in place of the old equipment as it would be to place it now where it was wanted; and that, further, it certainly was wiser to take equipment there where it could be found and not to wait until new equipment was to be had. Also the existing equipment was paid for already and it was certainly more economic to employ it instead of letting it remain unused as a charge upon the gas works. The problem most likely will not arise in so acute a form in this country, but the example shows what can be done in the matter of using dead equipment.

When to Enlarge the Plant

Every gas manager, of course, has a vital interest to let his generation plant work to its fullest capacity, and he would hardly be inclined to add to its size without having reached first the limit of production. Much economic waste, however, takes place in the case of practically all but the best served plants in the distribution of the manufactured product. It can be said without exaggeration that only 60 per cent of our distribution equipment is to-day in actual use. Considering the enormous value of this equipment that is a rather serious state of affairs. The fault does not lie entirely in the gas works. Their position as a public utility forces many of these plants to follow a business policy that would not be selected by any other business man, but which is considered perfectly right in the case of a public utility. There are many miles of main line employed to-day in the American gas distribution which serve a small number of customers only, costing incidentally not only an enormous amount in maintenance but necessitating the upkeep of a pressure in the mains which is not at all in bearing with the actual demand on the outlets. It is these mains which deserve the special attention of our gas managers in their endeavor to raise the efficiency of their equipment. Cases where additional supplies are wanted in the neighborhood of one of these partially used mains are very frequent. Would it not be in such instances a better policy to connect the less used main by a well placed side line instead of laying a new main along another route that may only too soon operate under the same condition as the other?

Getting 100 per cent of efficiency out of one's equipment, by the way, does not mean only to make the best use of the equipment. It may be applied with just as much justification to the regulation of the effort in comparison to the required result.

Estimation of Tar-Value of Mineral Oil

A stream of oxygen is passed through 150 grams of the oil at a temperature of 120 deg. Cent. for 70 hours. The rate of the oxygen flow is about 2 bubbles per second. Fifty grams of oil is then warmed on the water-bath with 50 cc. of a solution containing 1,000 parts by weight alcohol, 1,000 parts by weight water and 75 parts by weight caustic soda. The mixture is then shaken vigorously for five minutes and most of the alcoholic caustic soda filtered off. Forty cc. of the filtrate is shaken with 30 cc. of light petroleum and the caustic soda solution with 30 cc. of benzol. This last extraction should be repeated. The benzol solution is washed with water twice, evaporated, and the residue is dried at 100 deg. and weighed. [A. Krammer, Petroleum, 1919, 14, 1025.]

Ethyl Alcohol from Coke Oven Gas

Ernest Bury and O. Ollander Convinced that in Great Britain It Is Commercially Practical

Upon the premises that when what is taken from the gas production from coal in the shape of heat units has a value over a hundred dollars a ton and additional coal to replace it can be purchased at about eight dollars a ton, Ernest Bury and O. Ollander expressed their conviction before the Cleveland Institution of Engineers that alcohol extraction from coke oven gas is commercially practical in Great Britain.

Possibilities of Coke Oven and Gas Works Recovery

The only value which ethylene from coal gas has possessed up to the present, apart from fuel value, is its provision as an illuminant in the old flat-flame burner at one time used for household lighting, and since the calorific effect can be produced by the remaining constituents of coal gas, other than ethylene, simply by increased pressure, it follows that if the ethylene can be economically converted into alcohol, they declared, we are now ruthlessly consuming potential motor spirit for household heating, lighting, power gas engine, commercial heating processes, and the like.

Coal coked in by-product coke ovens in Great Britain in 1918 reached a total of 14,635,403 tons. One ton of coal has been found to yield 1.6 gal. of absolute alcohol. The annual yield of absolute alcohol is 23,416,640 gal. The above figures indicate the possibility of alcohol recovery from the by-product coke ovens at 23.4 millions per annum. If the country's gas works were to recover their possible ethylene, an additional quantity of 27 million gallons would be available. This would leave the British motor spirit condition as follows:

	Benzole Million gal.	Alcohol Million gal.
Gas works	34.0	27.0
Coke oven plant.....	30.0	23.4
	64.0	50.4

Total, 114.4 million gal., against requirements of 160 millions.

Early in 1912 Mr. Bury suggested to Alfred Hutchinson that when the principal aims of the iron, steel and coking plants had been established, the recovery of ethylene would present possibilities of large returns in alcohol and its derivatives, viz., acetic acid, acetone, chloroform, iodoform, and the like. The normal quantity of ethylene and its homologues present in coke oven gas from Durham coking coal is approximately 2 per cent, by volume, so that, given an ordinary chemical works efficiency of 70 per cent absorption of this gas as ethyl hydrogen sulphate, with a 70 per cent conversion of the latter to alcohol, a yield of 1.6 gal. of absolute alcohol—equal to 3.2 gal. of proof spirit—would be obtained per ton of coal. In other words, a carbonizing plant of the size of Skinningrove, dealing with 5,800 tons of coal per week, would produce 9,200 gal. of absolute alcohol, or 18,500 gal. of proof spirit, per week.

The yields of alcohol and its derivatives from such a plant, taking 50 per cent conversion of ethylene to alcohol as actually obtained, were:

Alcohol	9,280 gal., absolute
Acetic acid	7,164 gal., 80 per cent acid
Ether	6,450 gal.
Acetone	5,884 gal.

These figures, if the recovery could be made economical, presented very great opportunities for the production of substances ordinarily obtained from foodstuffs, which, apart from works economies, in view of our island position, must always be economized as a matter of national importance.

It was agreed finally that this subject must be thoroughly investigated when our principal mission had been executed. Mr. Bury put in a provisional patent for the recovery of ethylene by concentrated sulphuric acid in 1917, calling attention to the possible manufacture of alcohol and its derivatives from coal gas, the object being to prevent waste of foodstuffs. This patent was not completed in view of the revelation that Fritsche had taken out a similar patent at a much earlier date.

Government Participation

Shortly afterwards the manufacture of ethylene from alcohol was commenced at Government factories for the manufacture of mustard gas (dichlorethyl sulphide), and the Ministry of Munitions, knowing our aims in the direction of ethylene recovery from coal gas, suggested that we should embark on a joint research in this direction, and arrangements were made accordingly. Early in the research the Ministry suggested that, mustard gas being the crying need at the moment, we should aim at the recovery of ethylene itself, treating this hydrocarbon with sulphur monochloride to yield the poison gas dichlorethyl sulphide, and to this end proposed that the well known absorptive properties of charcoal should be utilized for removing the ethylene from coke oven gas. Experiments were carried out at the universities and Skinningrove, whereby it was shown that after the abstraction of sulphuretted hydrogen, carbon disulphide, and carbonic acid, the heavy hydrocarbons contained in the gas could be readily removed, these hydrocarbons consisting of any benzole and its homologues which escaped the benzole scrubbers, plus the unsaturated hydrocarbons C_nH_n.

It was proposed to pass the purified coke oven gas after drying with sulphuric acid through layers of beech charcoal, which after saturation would be removed from the gas and heated to yield ethylene and its homologues, the latter being passed direct into sulphur monochloride for the production of mustard gas. The heating of the saturated charcoal would be carried out by passing it through a molten lead bath, a device conceived by Lieutenant Morgan. Later on we, at Skinningrove, found that ordinary peat coke was an equally good absorbent when carbonized at high temperatures, and patented this application. Peat coke is obviously cheaper than charcoal made from timber. We are not a timber-producing country, and our available supplies have been sadly demanded by war demands.

Reducing Cost of Recovery

Charcoal or peat coke removes heavy gas, as such, without bringing about any change in composition. The action is not understood, but it can be compared to that of a sponge absorbing water. On heating the charcoal the absorbed gases are driven off in their primitive state. Gases are absorbed by charcoal roughly in order of their specific gravity, the heavier gases being first removed.

As a war measure, there is no doubt that, if hostilities had continued, the coke ovens in this district would have been called upon to recover direct ethylene by this method. As it was, however, the armistice followed a short time after these facts became assured, and at Skinningrove we had then to consider how far the use of peat coke would be an economic absorbent for a post-war industry, where the liquid derivatives of ethylene were required and not ethylene gas proper.

With this consideration in mind, we arrived at a comparison between the use of charcoal and of sulphuric acid, and at the outset it became apparent that if we could effect a similar degree of absorption with acid to that obtained by charcoal, the former would be preferable on the following grounds:

(1) Sulphuric acid is a coke oven product, and the acid required can be obtained from the coal itself. With charcoal we should be dependent on outside resources.

(2) To handle a solid product like peat coke through a large system which is virtually the main artery of the works is a much more costly and serious problem than pumping a liquid.

(3) The use of charcoal entailed the removal from the gas of carbonic acid; otherwise the latter gas is absorbed to the exclusion of the ethylene. The removal of carbonic acid from a large volume of coke oven gas by lime purifiers or lime washing is a serious matter as an industrial process, and is obviated entirely by the use of sulphuric acid.

(4) The heating of a solid substance such as absorbent peat on a point of fuel expenditure is greater than in the case of the direct heating of liquids where more perfect contact can be applied.

(5) By absorption with charcoal the latter will only take up 1 per cent of its weight, whereas we have determined that concentrated sulphuric acid will take up 5.1 per cent of its weight before ceasing to be efficient. Therefore five times the weight of charcoal has to be heated for the expulsion of the ethylene compared with sulphuric acid. This large quantity of charcoal has to be heated to 300 deg. Cent., whereas the lesser bulk of acid on concentration has to be heated to 220 deg. Cent.; therefore, on a point of fuel economy, the acid absorbent predominates.

Finally, we have as yet very little practical information as to how far the sulphur compounds poison the peat coke and render it inefficient.

Temperature and Rate of Absorption

These were the considerations which determined us to adopt the original absorbent, sulphuric acid, where the liquid derivatives of ethylene are desired; but there are many other possibilities where the use of charcoal or peat coke in the purification or selective separation of gases may be of the utmost advantage. At the outset it became apparent that, whether charcoal or sulphuric acid was to be employed, the recovery of ethylene and the manufacture of alcoholic derivatives could not be made to pay unless the fuel expenditure in the recovery process was cut down to a minimum amount, in view of the inflated price of coal. Furthermore, considerable portions of the sulphuric acid after absorption of ethylene are reduced to sulphur dioxide, which, without the recovery, would add very considerably to the cost of

manufacture. It was with the object of maintaining the economical possibilities of the recovery in these two particulars that the scheme now described was devised.

In the first place it became necessary to determine the rate of absorption. Instead of employing small laboratory vessels, leaden scrubbing towers 4 ft. high were utilized, from which it was ascertained that, given sufficient scrubbing surface, 70 to 80 per cent of the total ethylene could be absorbed by 95 per cent sulphuric acid (R.O.V.) at temperatures between 60 to 80 deg. Cent. Another set of experiments was conducted by leading coke oven gas of known ethylene content into a flask maintained at 60 to 80 deg. Cent., and containing 95 per cent R.O.V., and estimating the ethylene remaining unabsorbed at the end of half-minute intervals. The result of these latter experiments was that 71 per cent of the total ethylene was removed at the end of two minutes, a rate of absorption which is comparable with the removal of benzole by wash-oil (2.26 to 3.0 minutes).

The function of temperature in bringing about this reaction is of the very greatest importance. As a matter of text-book knowledge, 174 deg. Cent. is given as the most suitable temperature for the absorption of ethylene by sulphuric acid. But at these temperatures we obtained a jelly-like mass and only a small percentage of the alcohol possible. The reaction was then attempted at 95 deg. Cent.; but in this case also we obtained a carbon deposit, indicating decomposition. The temperature of absorption was then lowered still further—to 60 to 80 deg. Cent., at which a 71 per cent absorption became established; the acid remaining clear, and containing no carbon particles. Below 30 deg. Cent. the recovery is not worth while; the maximum lies between 70 and 80 deg. Cent. Above 80 deg. Cent. decomposition sets in. Our absorption experiments have been repeated and confirmed many times; and we have now confidence in submitting the temperature conditions as standard.

Processes Succeeding Absorption

Having ascertained the conditions under which the ethylene may be best absorbed for the manufacture of ethyl sulphate, we had to consider how this product could be further developed in the most economical manner. Two lines presented themselves: (a) The oxidation of the ethyl sulphuric acid by electrolysis or ozonized air for the manufacture of acetic acid; (b) the hydrolysis of the ethyl sulphate for the manufacture of alcohol and the recovery of the sulphuric acid for reuse in the system. We have satisfied ourselves on both these lines. By electrodes it has been determined that an 80 per cent yield of the acetic acid may be obtained from the ethyl hydrogen sulphate obtained from the gas. We are also content that on hydrolysis of the ethyl hydrogen sulphate with superheated steam, a 70 per cent yield of ethyl alcohol may be obtained. We have not yet investigated the nature of the higher alcohols which must be present in the remaining 30 per cent. The work is now proceeding.

The main problem which presented itself in the hydrolysis of the ethyl hydrogen sulphate for the manufacture of alcohol was the limit of dilution of the acid with water, bearing in mind the fact that the acid has to be reconcentrated for reuse in the ethylene scrubbers. The 95 per cent sulphuric acid (R.O.V.) used for absorption is reduced by the reaction $C_2H_4+H_2SO_4$ to 77 per cent acid. We have found that we can distil off the alcohol, leaving only traces of ethyl hydrogen sulphate in the spent acid, by admitting superheated steam, reducing the spent acid to only 74 per cent. We have reason to believe that this figure would be very much improved when working with normal distillation plant. The whole of this work was carried out with plant constructed from the scrap-heap.

The possibility of precipitating sulphuretted hydrogen from coke oven gas by means of SO_2 (according to the reaction $2H_2S+SO_2=2H_2O+3S$) was discussed between Lieutenant Morgan and ourselves in connection with the charcoal method of extraction; and we have since investigated the reaction at Skinningrove with the object of recovering the lost SO_2 from the acid employed on the alcohol plant. By passing the SO_2 waste from the alcohol plant into the coke oven gas, we have the means for recovering it by reaction with the H_2S present in the latter—not only purifying the oven gas and preventing the waste of SO_2, but providing the elementary sulphur for giving us the sulphuric acid required for alcohol recovery and sulphate of ammonia manufacture. Any balance of SO_2 required (above that provided by the decomposed acid) would be furnished by burning an adequate portion of the sulphur recovered.

In most coals volatile sulphur is present in sufficient quantity to give the sulphuric acid required for the manufacture of sulphate of ammonia. Since the sulphuric acid required for the recovery of ethylene is only borrowed, less the amount lost on concentration, it follows (speaking generally) that the waste SO_2 from the alcohol recovery will assist in recovering the volatile sulphur from the coal to be converted into sulphuric acid for all uses.

The sulphur precipitated from coke oven gas by this reaction would inevitably be in the form of a very fine fume, which at one time we thought of removing by electrostatic deposition. On further consideration, however, it appeared of vital importance to leave the reaction a little short of SO_2, in order to make sure of avoiding an excess of the latter, which would produce corrosion of the mains. On this account, we propose to limit slightly the amount of SO_2 present, leaving traces of H_2S in the gas, and passing the whole of the gas after the reaction through a single oxide purifier, which would serve (1) as a filter for the removal of the sulphur fumes, and (2) to extract the traces of H_2S left in the gas for the purpose of safety against corrosion.

Utilizing Waste Heat

In order to bring about the reaction for the recovery of ethylene from coke oven gas, both the gas and the absorbent acid have to be heated to 70 to 80 deg. Cent.; and since the quantities of gas and acid are respectively 139 and 106 tons per day, this would represent considerable quantities of fuel to secure the required temperature. Fortunately, however, in the cooling of the gas in the normal by-product recovery, sufficient sensible heat is wasted, which can be employed for heating the gas, and so obviate the purchase of any fuel on this account. The wet gases as they leave the hydraulic main at 250 to 300 deg. Cent. are more than double the volume of the cool gas requiring to be heated, and sufficient heat is therefore available by employing an efficient system of heat exchange to heat the cool gases to 70 to 80 deg. Cent. The heating of the acid will be

carried out by producer gas made from waste coke-dust briquettes; and since the temperature of the acid leaving the concentration plant is 220 deg. Cent., sufficient waste heat is thus provided in the acid to carry out the reaction in the ethylene scrubbers. Thus the heating of the acid is provided by the concentration process. As to the actual expenditure of fuel in distilling the alcohol from the ethylenated acid, we have no exact figures just at the moment; but bearing in mind the fact that the hydrolysis is effected by superheated steam, and that the reaction between steam and sulphuric acid is exothermic, we expect only a light expenditure in fuel for this part of the process.

Effect on Calorific Value of Gas

The point has been raised that with the removal of the ethylene from the coke oven gas the calorific value of the gas will seriously suffer. The subjoined figures show how the calorific value of the coke oven gas is composed according to the percentage of ethylene and other constituents present:

Calorific Value of Constituents of Average Coke Oven Gas from Durham Coking Coal

Average Composition.	Volume per cent.	B.t.u. per cu. ft. Gas.	Total Calorific Value. Per Cent.
CO_2	2.0	——	——
O_2	0.5	——	——
C_2H_4	2.0	32.1	6.86
CO	5.4	17.6	3.76
CH_4	25.0	255.0	54.53
H_2	50.0	163.0	34.85
N_2	Diff.	467.7	100.00

It will be seen that the ethylene extracted (70 per cent) represents only 4.7 per cent of the total calorific value. It will be remembered, also, that, in order to effect the absorption of the ethylene by concentrated sulphuric acid, the gas has to be previously dried by 80 per cent sulphuric acid, i. e., the same acid as is required for the sulphate plant; and on calculation it will be found that the dry gas so obtained is only 1.1 per cent lower in calorific value than the moist coke oven gas before ethylene removal.

Inlet Gas Calorific Value

	Volume per cent.	B.t.u. per cu. ft.
CO_2	2.0	——
O_2	0.5	——
C_2H_4	2.0	32.10
CO	5.4	17.60
CH_4	25.0	255.00
H_2	50.0	163.00
N_2 + water vapor	Diff.	467.70

Outlet Gas Calorific Value

	Volume per cent.	B.t.u. per cu. ft.
CO_2	2.08	——
O_2	0.52	——
C_2H_4	0.62	9.95
CO	5.61	18.29
CH_4	25.96	264.72
H_2	51.91	169.23
N_2	13.30	462.26

Difference = 1.1 per cent.

There is, therefore, no need for apprehension that, by lowering the calorific value or the calorific intensity by the recovery of the ethylene, the heating of the ovens will be jeopardized. On the other hand, since the moisture is removed by the 80 per cent acid, an expenditure in fuel will have to be made at the sulphate plant in compensating for same. But since the sulphate house steam is generated from waste gases, and where proper play is made of the sensible heat of the coke oven gas entering the sulphate house, this expenditure is not of serious moment, taken in conjunction with the remaining fuel economies in the recovery of the alcohol against the value of the latter so produced.

The coke oven gas, after the ethylene absorption, will leave the scrubbers to pass on to the oven flues, steelworks, and soaking pits, at a temperature of 60 to 80 deg. Cent., where this waste heat is utilized. In other words, the heating of the gas for the recovery of ethylene also does duty in plant where the coke oven gas is finally consumed.

The Sequence of the Process

The sequence of the process for the successful recovery of ethylene by means of concentrated sulphuric acid in connection with ordinary by-product recovery plant is as follows: The hot gases from the oven pass from the hydraulic main to a heat exchanger (in which some of their heat is given up to the cooled and purified gases), and thence to the usual plant for the recovery of tar, sulphate of ammonia, naphthalene, and benzole. The cooled gas, after the removal of these products, passes next to a sulphuretted hydrogen purifier, then through oxide purifiers, and thence to a moisture absorber or scrubber in which 80 per cent sulphuric acid is circulated, whereby the gas is dried. Then the gas passes to the heat interchanger, in which it is heated by the gases from the carbonizing plant, and thence to the ethylene scrubber. The de-ethylenated gas issuing from these scrubbers passes out to mains conveying it away for use in the heating of coke ovens, to the steelworks, gas engines, and soaking pits. The temperature in the scrubbers is maintained in the range between about 60 and 80 deg. Cent., in which range we have found that the olefines are most efficiently absorbed. The acid with the absorbed olefines in the form of ethyl hydrogen sulphate, issuing from the first scrubber at which the gas enters, passes through a heat exchanger to a primary alcohol still. The acid thence flows to an acid concentrating and heating plant (a Guiard tower), to which heat is supplied from a producer fired with coke breeze, or other practically waste fuel. The reconcentrated acid passes out to a tank, whence it is circulated again through the scrubbers, fresh acid being supplied

as required to make up for that which is consumed in the process. A pipe from the alcohol still leads to a condenser in which the crude alcohol is collected. A pipe from the condenser and a pipe from the acid concentrating and heating plant convey the sulphur dioxide gas which is evolved as a reduction product, to a sulphuretted hydrogen purifier, where it is utilized for reacting with the sulphuretted hydrogen in the coal gas to precipitate sulphur according to the equation: $2H_2S + SO_2 = 2H_2O + 3S$. This sulphur is removed and conveyed to sulphur burning plant, wherein it yields sulphuric acid for use in the scrubbers and in the plant for manufacturing ammonium sulphate.

The preliminary heating of the crude gas from which the normal by-products (tar, ammonia, benzole, and so forth) have been removed is effected up to a temperature of 60 to 80 deg. Cent., and the acid for absorption is also heated to this temperature range, because it is found to be essential for the removal of the relatively small percentages of ethylene from the gas as ethyl acid sulphate. The olefine scrubbers in which the absorption takes place may be three or more in number, lined and packed with acid-resisting material, over which the hot acid from the cascade is passed. Here the warmed gas flows over large surfaces moistened with acid, the amount of surface so provided being such as to give the maximum absorption of the olefines. Hot acid pumped out of contact with air is circulated through the scrubbers until the acidity has been reduced by about 18 per cent. The flow of acid is in counter-current to the gas, so that a constant stream at this degree of concentration passes out from the first olefine scrubber.

The flow of acid leaving the scrubber is passed down a distilling column to the heat exchanger and alcohol still, meeting an upward current of superheated steam. The mixture of alcohol vapor with steam passes from the distilling column to a condenser, the ultimate solution of alcohol and water so condensed being finally distilled over lime to yield absolute alcohol or proof spirit as may be required. The addition of water and steam to the column is minimized as far as possible short of the production of ether and consonant with the complete distillation of the alcohol. The hot diluted acid from the distilling column can be passed by a pipe direct to the reconcentrating plant. The scrubbers may be of a type in which electrostatic deposition is employed, or wherein a ferric-oxide bed filter is used to prevent loss of sulphuretted hydrogen.

We have submitted nothing which is new in the matter of pure chemistry. The reactions are all well known. All we claim is the application of these reactions to industrial practice in the preparation of cheap industrial alcohol from coal. We consider the following points as being new:

(1) The temperature, 60 to 80 deg. Cent., at which the absorption of ethylene by coke oven gas may be effected so as to give an ordinarily good chemical yield without decomposition of the original products.

(2) The cutting-down of the absorption area required for the removal of the ethylene from coke oven gas by heating the gas and absorbent acid to 60 to 80 deg. Cent.

(3) The implementation of waste heat and fuel for the reactions, which have not up to now been utilized for any other purpose.

(4) The utilization of the decomposition product, i. e., SO_2, for recovery of elementary sulphur and simultaneously the purification of the coke oven gas; the quantity of sulphur so obtained generally being adequate for the manufacture of the sulphuric acid required for the whole of the coke oven operations, in addition to the acid requirements of the alcohol plant itself.

This completes our statement of the preliminary experimental work, which has satisfied us that we can make cheap alcohol from coal gas on an industrial scale. A number of chemical engineering difficulties present themselves in working out the large-scale process, but there is nothing which is in the least degree insurmountable.

Some Points on the Tempering of Tools

Useful Particularly for the Distribution Man Whose Aim Is to Sell Gas for This Purpose

By GILBERT G. SHADWELL

Although much has been written on the subject of steel hardening yet the important features of tempering do not appear to have been dealt with specifically to so a great an extent.

Tools being among the products most commonly met with in this line of work it is considered that a discussion of methods employed will be of greatest value to industrial men from a practical standpoint.

Firstly, we will consider the tempering of taps. In doing so, we should bear in mind that a tap is simply a series of cutters on a bar; hence the cutting parts must be uniformly hard enough to cut, and the base soft as possible to insure durability.

This can be best accomplished by dipping at as low a heat as possible, making the outside hard while the inside will be comparatively soft, when rubbed off ready for tempering.

Heat a heavy ring (a broken pulley hub is as good as anything), which have on the side for use while hardening taps, and also a heavy pair of tongs made hot in the same way.

Take the lever end of the tap with the hot tongs and insert the tap in the center of the hot ring, but do not let it touch the sides. It is better to keep turning it around. If the temper draws too fast, where held by the tongs, cool it and move backward and forward until the right color is attained. This, too, depends on the quality of the steel and size and make of the tap, and, lastly, the purpose for which it is intended.

Tempering Axes

The tempering of axes is of interest and will now be discussed. The poll should be heated in a muffle until it is a little more than a cherry red, then change ends and heat the bit to a cherry red. Cool the bit only in cold salt water. Immerse in the water at once, otherwise there may be a fire crack in it which will spoil it. Score with brick, put the poll in the furnace endways. The temper should run into a blue. Do not use an oxidizing flame on any account.

The tempering of cold chisels is accomplished by heating the chisels at a low temperature so as not to raise a scale. Dip in a brine of clear salt and water. About one quart of salt to 10 quarts of water is the right proportion. Leave heat enough in the tool to run the temper down to a required hardness which is shown by the pigeon blue color. Take care to make the chisels stout enough that they won't spring in the using.

Tempering Drills

The tempering of drills may be carried out in several ways, depending upon the use in the same way as the hardening of those tools. A drill heated to a low red, and plunged in a strong solution of chloride of zinc will drill glass.

A third method is as follows: The drill should be heated to a cherry red in a muffle furnace, then plunged into cold water to which a handful of salt is added. Make the drill bright and draw to a light straw color.

Screw gauges are best handled by heating in a lead bath for which purpose a regular soft metal furnace can be used. The procedure is as follows: Heat in molten lead, harden in cold water or brine pickle, polish bright, draw to a straw color in hot sand. If the steel is homogeneous there will be no change in size.

To temper gravers, instruments larger than drills, mercury can be used, but lead may be added as a substitute. The lead is lessened about half an inch, and the instrument, made light red hot, is pressed into the cut. The melted lead then surrounds it. It is important that the lead furnace be an efficient type.

The tempering of knife blades requires care about the heating or otherwise the blade may be warped out of shape. When the blade is heated evenly, plunge it perpendicularly in a bath of raw linseed oil. The blades may be heated between two straight pieces of iron. The temper should be drawn on a hot iron.

So far no direct mention of any of the tempering liquids has been made, so that we will quote a few at this point. They may be heated where requisite in a tank furnace. One consists of saltpeter, 1 oz.; alum, pulverized, 2 spoonsful; salt, 1 tea cup; soft water, 2 gal.; never heat over a cherry red nor draw any temper. The next consists of water, 2 gal.; saltpeter, ½ oz.; pulverized borax, ½ oz.; white vitriol, 1 oz.; salt, 1½ pints. In this case heat steel to a cherry red, plunge in but draw no temper. The next consists of water, 2 gal.; saltpeter, 2 oz.; alum, 2 oz.; pulverized sal ammoniac, 1 oz.; salt, 1½ lb. This is used as in the previous case.

The next is a dangerous poison and must be stored carefully: Put one-half ounce of corrosive sublimate in three quarts of soft water and add one handful of common salt. Dissolve it and it is ready for use. This gives toughness and hardness to steel. The last is made up of alum, 1 oz.; saltpeter, 1 oz.; sal ammoniac, 1 oz.; salt, ¾ lb.; soft water, 1½ gal. In this case draw no temper.

Mill Chisels

The tempering of mill chisels for cutting French burr involves some points of difficulty, although gas has meant a vast improvement in their treatment. If cast steel be made white hot it is spoiled; yet if a person takes a chisel mill pick or other pointed tool to be repaired the average smith pushes it into his fire. The point is soon white hot. They will now push it in and out of the fire a few times and at the last bring it out red hot and work it. Of course, it is already spoiled, and no matter how long it is tempered it is next to useless.

The use of a gas furnace, if not too small, will take care of the work better if a little judgment is exercised. The gas man should see that the operator puts the tool in the furnace in such a way that the middle gets red hot first of all. As soon as the middle is red hot, pull it back and let the thin end just get a dull red heat.

A gas forge furnace will do this nicely if care be taken.

It must now be hammered edgeways first and flatways last of all. It is best to hammer it on the flat part of the anvil, as drawing steel on the edge of the anvil, although a great deal quicker, makes it short in the grain and always causes the tool to break in the thinnest place. The other end can be handled the same way, only repeat as soon as it loses its dull red color. The lighter the blows in working steel the tougher it is. The point should be quite as thin as a fitter's clipping chisel, only a little longer, then they will not require doing up so often. When the ends are drawn out the middle will have lost its red heat. The ends can now be filed a little.

To temper them, treat them as before, using the flame of the gas forge with great care. When a very dull red heat has been reached, cool in rain water with the chill taken off, about three-quarter inch from the end and let down to a blue. If it should be too little, a little lower. Heat the other end the same. Cool all over. Grind the edge rather blunt, and for the first few blows hit it lightly as possible. A little soap suds or oil could be poured on the water, but straight water is best. The secret is in working it at as low a heat as possible, but keep on repeating very often and to hit edgeways as little as possible but flatways as much as is possible.

To temper mill picks it must be understood that there is nothing peculiar in hardening this work, but they must be as hard as possible and moderately tough. The greatest care should be taken to avoid burning the steel. Where there is much work to be done, the picks can be heated in a pot of cherry red hot lead, then dipped plumb into clear water at about 60 deg. Fahr. Do not draw the temper. The hardening by the ordinary muffle furnace is quite satisfactory. The work, however, must not be hurried, because in case an oxidizing flame is used, hurry may burn the corners. Much also depends upon the shape of the pick as to whether a sectional or leaf pick, or a thick solid pick, the last being the more difficult to manage, on account of the sharp edge and thick back. They should be set in the furnace in such a way as to heat the "eyes" as hot as the edge.

The following mixture may be used with good results. Prepare a mixture of:

Water	1½ gal.
Ammonia	1½ oz.
White vitriol	1½ oz.
Sal ammoniac	1½ oz.
Spirits of niter	1½ oz.
Alum	1½ oz.
Salt	3 oz.

And one handful of horse hoof parings.

This should be kept in a jar tightly corked. The pick should be heated to a dark cherry red and cooled in this bath. Do not draw the temper.

Coil Springs

Tempering of coiled springs requires much judgment,

(*Continued on page* 186.)

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As the Journal Views It

Placing the Business Where It Is Most Needed

Various gas companies have considerable investments in mains that serve but few consumers in proportion to interest charges; not because they want to have mains in such situations, or that at one time they were managed by an imbecile, but because they had to place them there as part of the price of the precious privilege of being a public utility and a monopoly.

Since they are there and since more investments of similarly unsound nature will have to be made in the future it would seem that a definite policy of making the best of an economically unsound business should be universal.

There are a definite amount of dwellers along these mains. Unless it chooses to go into the renting or real estate business, the gas company cannot increase that number. Its only means of securing the same end, getting a paying amount of gas flowing through those semi-idle mains, is to get a bigger amount of consumption out of the individual consumer than its records lead it to expect of the average.

This can be accomplished. Few gas companies, if any, have ever really gotten down to intensive merchandising. They have staged intensive campaigns now and then. Many have, as a formality, handed a dreamy-eyed solicitor direct responsibility for certain districts. But real, sustained, driving merchandising over a protracted period has seldom come to our attention. Perhaps as a general policy it might not have been the best merchandising viewed from all angles.

The people who go out to live in the kind of sections where gas mains are unprofitable are the kind who really want to live. The kind who particularly dis-

like crowding, dislike drudgery and the monotonies of life. They are the kind that the labor-saving and convenience-affording features of gas appliances should particularly appeal to. The cost would be the big obstacle that would stand in the way, but they could be easily sold on the idea.

We know that in proportion to what it gives, gas is very cheap. We know that if intelligently used it is even cheaper. Knowing that, if the gas company's merchandiser cannot sell the idea to the consumer, the company had better look around for a higher type of merchandiser.

Particularly in new developments should an assurance of more than average consumption per dwelling place be relatively easy to obtain.

There is always friction about getting the gas mains in. The average builder expects it, counts on having to call in all the authorities short of the Governor of the State before he gets action from the gas company.

Perhaps he knows the underlying reason for the gas company's reluctance; that anyone is unwilling to assume fifty dollars in interest charges to get forty-eight dollars' worth of business. But he is not thinking of the gas companies' interests. He is concerned only with his own.

How easy it would be to demonstrate to him how the gas company's interests could be guarded and his own even furthered. How much quicker and at how much better price a house would sell if it were equipped with all the conveniences gas could supply, and the advantages of these conveniences were fully pointed out. What a gem of a place it would seem to the prospective purchaser that he was getting.

It would be an advantage both to the gas company and to the builder. And it would eliminate friction, make getting gas main extensions a mere matter of the asking.

Inconsistent

"Show me summer business to counterbalance it," challenged a gas company executive, "and I will agree with you that this company ought to go in harder for house heating business!"

"An idle gas range in the winter," mourned another executive of the same company a short time later, "represents a part of our plant idle, that we pay interest on an investment every day of the year from which we get a return during but a fraction of the year. We must get people to use their gas ranges in the winter as well as in the summer."

A number of years have passed since these statements were made. Despite the efforts of the company to change their habits a goodly portion of their consumers still religiously turn to the coal range when the chill Fall days come creeping on.

Why talk of a counterbalancing summer load for this company *yet?* Does not the cooking load already provide it?

While the company delays in its effort to build up a house-heating load from the fear of idleness of that part of the plant during the summer, the load chart shows a peak at that season.

Of course, every step the gas company takes should be taken conservatively.

In the ideal condition there should be no peaks and valleys. And the gas range should be kept at work every day throughout the year.

With such a condition existent it would be unwise to build up a house-heating load in winter without a corresponding essentially summer load to counterbalance it. But such a condition does not exist. A healthy winter house-heating load for this company would be a positive boon.

From the Journal Sixty Years Ago

Sanders Water Gas had to pay for advertising space to explain its merits to gas men.

The JOURNAL startles the gas fraternity by revealing the startling fact that the purification of gas by metallic oxides was patented half a century ago—this in 1860.

A series of articles on "Practical Management of Gas Works" is started in the March, 1860, issue of the JOURNAL.

The JOURNAL thus early in the gas business suspects "nine-tenths of the municipal legislation in the country is based on greed for plunder to be got at all hazards."

John C. Cresson, engineer of the Philadelphia, notifies the JOURNAL that the new works at Point Breeze are rapidly approaching completion. In the same issue is a report on the destruction of the new retort house by a tornado.

Some Points on the Tempering of Tools

(*Continued from page* 184.)

based on experience with the particular kind of spring that you wish to temper. A coiled spring does not give the faintest idea of its form, size, length, thickness, kind of steel or whether it is a clock spring or car spring, all of which must be considered in the method of treatment. As a general rule, springs that are slender and liable to lose shape in an ordinary furnace, should be heated in a muffle furnace or else in an oven furnace of good design, and hardened in water or, better still, in oil. The temper should be drawn in boiling linseed oil. Springs that have stiffness like car springs may be heated in a covered forge furnace to good advantage and hardened in lard oil.

To temper the general run of steel springs, heat to an even red heat, rather low, to prevent cracking and quench in lukewarm water. Place in ladle with enough tallow to cover it; heat until the tallow burns with a

large flame extending beyond the ladle, then set the ladle aside and allow it to cool.

To temper gun springs, heat them evenly to a low red heat and quench them in cold water with the cold chill taken off, keeping them immersed until reduced to the temperature of the water. Place an iron pan containing lard oil and tallow in almost equal parts, over a burner and place the springs therein; then heat the pan until its contents take fire; then hold the springs in the flames, turning them over and over and dipping them occasionally in the oil to keep them blazing. When the oil adhering to them blazes freely when they are removed from the flames, place them aside to cool. In the tempering of revolver springs heat the spring to a cherry red and plunge in linseed oil. To draw the temper to the desired degree, hold the spring over the fire and allow the oil to burn away. Take away from the fire, put on more oil and let it burn away. Burn the oil off three times and plunge in the oil again. The spring is then ready for use. Do not overheat the steel. Test the temper frequently with a file.

To temper a small spring, heat the spring to a light red, plunge in cold water, hold the spring over the flame of a small fire of shavings until it becomes black, then hold in the furnace until the black disappears. Cool the spring by swinging in the air.

A very satisfactory method is to heat the spring to a cherry red heat and then quench in lead at 600 deg. Fahr. This is splendid for springs up to one-eighth inch thick.

In the tempering of steel, in judging the proper temperature and corresponding hardness, the following table serves admirably:

Article.	Composition of Metallic Mixtures. Lead.	Tin.	Melting Point. Deg. Fahr.	Colors.
Lancets	7	4	220	Pale yellow
Razors	8	4	228	Pale yellow to Straw yellow
Penknives	8½	4	232	Straw yellow
Scissors	14	4	254	Brown
Clasp knives	19	4	265	Purplish
Joiners and carpenter's tools	19	4	265	Purplish
Swords, cutlasses, etc.	48	4	288	Bright blue
Watch springs	48	4	288	Bright blue
Stilettoes	50	2	292	Deep blue
Boring tools	50	2	292	Deep blue
Fine saws	50	2	292	Deep blue
Ordinary saws (in boiling linseed oil)			316	Blackish blue

It is often difficult to heat a piece of steel uniformly, consequently, molten metallic mixtures are employed, chiefly made up of tin and lead; the bright hardened steel is kept in these molten mixtures until it has assumed the temperature of the bath. The foregoing tabulated form exhibits the composition of the metallic baths which have been found the best for tempering cutlery. The process of tempering steel consists in reheating hardened steel to a temperature varying with the degree of hardness required, and coloring it by immersion in the same manner. The proper temperature is indicated by the color of the thin film of oxide formed on the surface of the heated metal according to the following scale:

	Temperature. Deg. Fahr.	Color.
Lancets	220	Pale yellow
Razors and surgical instruments	230	Straw yellow
Common razors and penknives	243	Golden yellow
Cold chisels, shears and scissors	255	Brown
Axes, planes	265	Brown dapled with purple
Table knives and large shears	277	Purple
Swords and coiled springs	288	Bright blue
Fine saws, augers, etc.	293	Dull blue
Hand and pit saws	316	Dark blue

The reheating is generally effected in baths of molten metals or metallic alloys having definite fusing points. These alloys of tin and lead in varying proportions may be used up to a temperature of 300 deg. Fahr. with not much trouble; often, however, higher temperature than 300 deg. Fahr. even up to 700 deg. Fahr. In higher temperatures use boiling linseed oil in a furnace and beyond the safe point for the oil, pure lead is used.

Oil Increases Tenacity

The tenacity of steel is highly increased by tempering with oil instead of water. In tempering cast steel, dissolve a small quality of sal ammoniac in water, make the metal red, drop it into the mixture for a second or two, and take it out, leaving enough heat in the metal to draw it back a bit. If left until cold the steel will be a great deal too hard.

The following table will be found useful in work referred to above:

Temperature Required

	Deg. Fahr.
Annealing Steel	900-1000
Annealing malleable iron	1000-1400
Annealing malleable cupola iron	1500-1700
Annealing glass	950-1200
Working glass	1200-1475
Hardening tool steel	1200-1400
Case hardening iron and soft steel	1300-1500

Temperature Colors of Steel

Faint yellow	430
Straw color	460
Dark straw	470
Purple	530
Blue	550
Full blue	560
Polish blue	580
Dark blue	600
Bright red (in dark)	750
Red hot (in dark)	880
Red (by day)	1075

The reader will understand that many points of elaboration might readily be given on this almost endless subject, but it has been more the object of the writer to give some of the more salient points than to deal with the subject as a whole.

Selling Fall Styles in Spring

The Portland (Ore.) Gas & Coke Company Rushes the Season in House Heating and Results Have Sir Arthur Sullivan Outsung

By JOHN H. HARTOG

Manager of Sales and Advertising Department, Portland (Oregon) Gas and Coke Co.

It is a fact that, in spite of all warning, everybody wants to get downtown, everybody wants to start back for home and everybody wants to lunch at the same time, thus causing everlasting congestion and the dreaded peak-loads.

In the same way, everybody wants his Gasco briquets (in the case of the Portland, Ore., company) or his coke or heater the same day. And that day is the day after the first snappy, cold fall morning. Advertising is one means of educating the public to provide ahead, and the efforts in that direction are therefore spent not on selling briquets, or coke, or heaters, but on persuading the customer to order ahead.

As it is with Gasco briquets, the Portland, Ore., company, finds, so it is with the Gasco furnace. It is hard to believe how many people waited last fall until the very last moment, and then begged and plead to have the furnace installed immediately.

In order to reduce this fall peak-load and shave off some of the peak to fill up some of the valley's bottomland, a campaign was started in the four daily papers of Portland, Ore., to persuade some persuadable citizens to place next winter's order now. It seemed like "rushing the season" to urge people to order their fall style of heating in the month of February. Could it be accomplished? Could anyone be persuaded to be so forehanded?

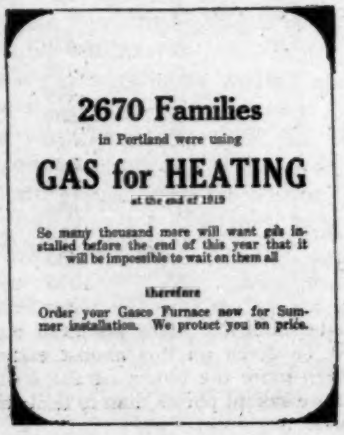
The experiment was made and the results were a revelation.

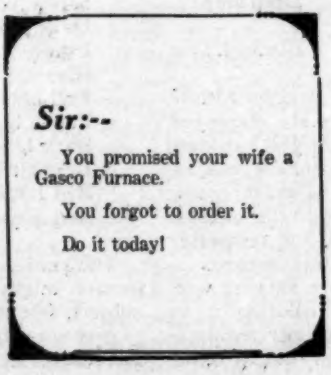
A slight raise in the price had become necessary, as no advance had been established throughout 1919, in order not to place obstacles in the way of the sales efforts.

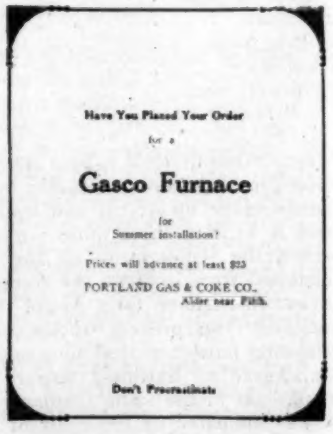
So it was announced that all who would order their furnace now, so that the company could install it in the summer, would be waited on at the old price. A two weeks' campaign was decided on but, knowing that human nature would put off even this until the fourteenth day, the ads announced this special privilege for only one week. It worked like a charm, and the last day of the first week saw more orders entered that one day than during any six months of 1918.

The next day, Sunday, an announcement was made that, owing to the success of the sale and as so many came in the final day, it had been decided to extend the sale one more week.

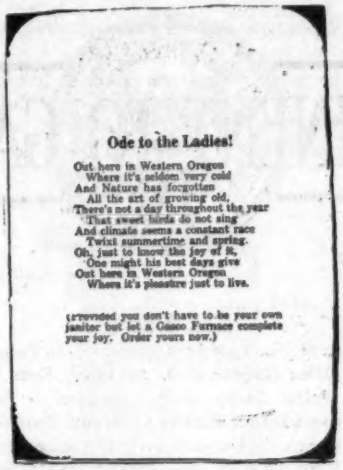
This reminds one of Sarah Bernhardt (the "French" actress born in Amsterdam, Holland), whose absolutely last and final "farewell"


2670 Families
in Portland were using
GAS for HEATING
at the end of 1919
So many thousand more will want gas installed before the end of this year that it will be impossible to wait on them all
therefore
Order your Gasco Furnace now for Summer installation. We protect you on price.





Last Call!
Today and tomorrow you can order your
GASCO FURNACE
At the old price for summer installation.
Don't wait till the rush is on!
Do It Now


Ode to the Ladies!
Out here in Western Oregon
Where it's seldom very cold
And Nature has forgotten
All the art of growing old,
There's not a day throughout the year
That sweet birds do not sing
And climate seems a constant race
Twixt summertime and spring.
Oh, just to know the joy of it,
One might his best days give
Out here in Western Oregon
Where it's pleasure just to live.
(Provided you don't have to be your own janitor but let a Gasco Furnace complete your joy. Order yours now.)

tour was invariably followed by "just one more."

The salesforce had had a busy week and all felt that the available fish had all been caught; but, behold, on Monday a dark speck was seen in the distant water and, sure enough, before long another school of fish appeared, ready for business.

And, to everybody's joy, Monday went Saturday one better. And Tuesday was no slouch either. So the week went on; it was indeed a revelation.

But Sarah Bernhardt sometimes came back not only "once more" but "twice more," and in the same way one more opportunity was advertised on the fourteenth day, to the effect that any orders mailed before Monday or estimates requested before noon of that day would still be entered at "Ye auld pryce."

And, though speaking of fish, this is no fish story; that second Monday repeated the top-notch figure of any day, making a total of eighty-seven furnaces sold in two weeks. Mind, these were not the little one-room heaters that sell for "nothing down and nothing a week until paid for," but heating installations of sixteen, twenty-four and thirty-two section vents radiators, costing from a minimum of $350 up to $700 or $800 each.

This would figure approximately $43,000 worth of appliances in two weeks, not counting any cost of ducts, etc.

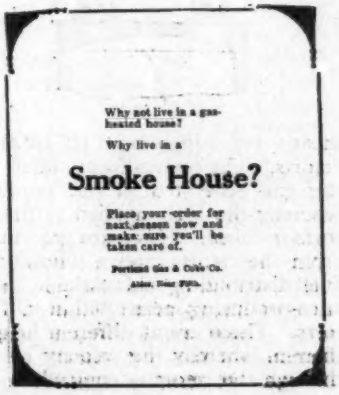
Does it pay to advertise? What would one have to pay salesmen on commission? Every reader has an idea of what it would take to interest the services of a salesman who could go out and land the customers. Well, the advertising averaged about $6 per furnace.

And yet the principal idea of this "rushing-the-season" campaign was not so much to land orders as to get people used to being talked to about ordering ahead. Many were unwilling or unprepared to order in February for next year; for out West here it's different from staid old Philadelphia or other old-fashioned burgs where people live in one house for a generation. Out West here it is a great country for lunch clubs. Some days one will find four or five of them in one hotel; and "talks are had" (not made), resolutions are made (and forgotten), committees are appointed (and shelved), and when a member cannot "move you, sir," why, he move his family, for "move" he must. We're on the go all the time, and Polk's City Directory people have to hustle their book or it's half obsolete before it's off the press.

So the company, with love for its fellow men, who ought to quit shoveling coal and get into the bandwagon and buy a "furnace with a self-starter," has another campaign up its corporate sleeve to spring in the fall. Sir Arthur Sullivan sang of the "Flowers that bloom in the spring, tra-la, have nothing to do with the case"; but as to "falling" for a campaign in the "spring," or "springing" another campaign in the "fall," thereof Sir Arthur wot not, for who ever heard of a Mikado being wise to a Gasco furnace?

Price Goes Up Monday!
Orders mailed before Monday and requests for estimates received by us before Monday noon will be based on the old price
Portland Gas & Coke Company

"Heads You Win Tails We Lose"
If you place your order for a
GASCO FURNACE
now, we protect you against market changes, and install the furnace before the Fall rush comes on.


Why not live in a gas-heated house?
Why live in a
Smoke House?
Place your order for next season now and make sure you'll be taken care of.
Portland Gas & Coke Co.

PATENTS PERTINENT TO GAS INDUSTRY

Production of Ammonium Sulphate

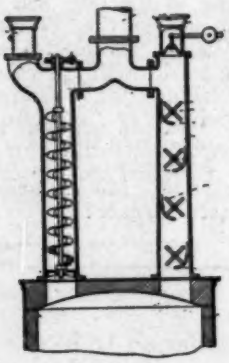
Patent No. 1,328,342; described in Patent Office *Gazette*, Jan. 20, 1920, page 372. William A. Sloss, Toledo, Ohio. Filed May 22, 1919. Serial No. 298,947. 8 Claims. (Cl. 23—21.)

This process of purifying ammonium sulphate consists of heating commercial ammonium sulphate to a temperature above that at which pyridin becomes volatile, and then treating it with ammonia while said temperature is maintained.

Gas Generator

Patent No. 1,327,893; described in Patent Office *Gazette*, Jan. 13, 1920, page 250. Thomas Roland Wollaston, Manchester, England. Filed Jan. 19, 1918. Serial No. 212,649. 1 Claim. (Cl. 48—86.)

Vertical retorts are situated above and are in continuous communication with the gas producer. There is a

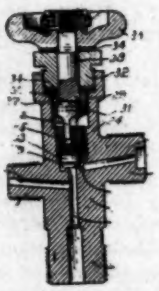


means for supplying fuel to these retorts. The retorts form outlets for the gas generated in the producer whereby the fuel supplied to the retorts is coked. There are gas outlets from the retorts, and a plurality of fuel distributing and variable interstice-producing means within said retorts. These are at different heights therein, whereby the velocity of gas through the retort is controlled.

Gas-Valve

Patent No. 1,328,578; described in Patent Office *Gazette*, Jan. 20, 1920. Seth G. Malby, Derby, Conn., assignor to Ansonia Manufacturing Company, Ansonia, Conn., a Corporation of Connecticut. Filed Sept. 18, 1919. Serial No. 324,384. 5 Claims. (Cl. 251—48.)

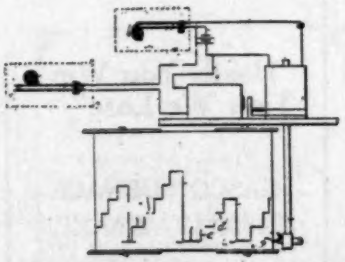
This device has a chamber and a threaded plug adapted to close the



chamber. The plug is provided with a slot and a key engaging the slot, with a circular head. A valve stem, having a socket, receives the circular head. A soft metal pin passes through the walls of the socket and the head of the key.

Oven Burner for Gas Ranges

Patent No. 1,328,589; described in Patent Office *Gazette*, January 20, 1920. Clarence V. Roberts, Philadelphia, Pa., assignor to Roberts & Mander Stove Company, Philadelphia, Pa., a Corporation of Pennsylvania. Filed Oct. 20,



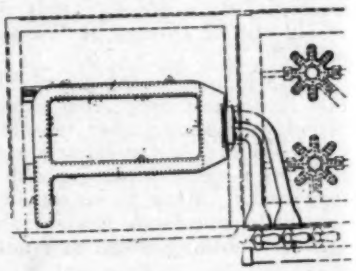
1917. Serial No. 197,569. 1 Claim. (Cl. 158—105.)

This oven gas burner is made in a single casting and has two longitudinal sections which are perforated for the escape of gas. There are two end sections which are also perforated. In one of these end sections there is a partition. An igniting portion forms a continuation of the other end section which has a partition therein. The igniting portion is also perforated. The parts are so arranged that the gas escaping from one, or both, of the burners, can be ignited, or the gas escaping from one burner can be ignited from the flame of the other burner.

Gas Metering Apparatus

Patent No. 1,327,989; described in Patent Office *Gazette*, Jan. 13, 1920, page 268. Louis A. Ferguson, Evanston, and Harold S. Sines, Oak Park, Ill.; said Sines assignor to said Ferguson. Substitute for application Serial No. 872,713, filed Nov. 18, 1914. This application filed Jan. 24, 1917. Serial No. 144,123. 2 Claims. (Cl. 234—34.5.)

This is a mechanism for measuring



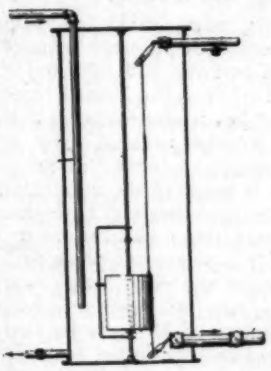
and integrating the consumption of gas. It is comprised of a gas meter and a recording device adapted to indicate the greatest amount of gas integrated by the gas meter during any one of a number of intervals of time. Also an electromagnetic mechanism for operating the recording device. There is a circuit for said electromagnetic mechanism; quickly acting contacts are included in this circuit. A shaft is driven from the integrating train of the gas meter. A cam for operating the contacts is loosely mounted on the shaft. A spring is interposed between the shaft

and cam. There is a means for normally preventing the cam from moving under the action of the spring. Also a means for permitting the spring to actuate the cam when a predetermined amount of gas has been measured and integrated by the gas meter.

Apparatus for Separating Oil and Gas Direct from Wells

Patent No. 1,327,691; described in Patent Office *Gazette*, Jan. 13, 1920, page 213. Albert M. Ballard, Drumright, Okla., assignor to Sun Company, Philadelphia, Pa., a Corporation of New Jersey. Filed March 12, 1919. Serial No. 282-141. 1 Claim. (Cl. 137—103.)

This oil and gas separator is a tank having a gas outlet, arranged at a relatively high elevation, and an oil outlet arranged at a relatively low elevation. There is a float in the

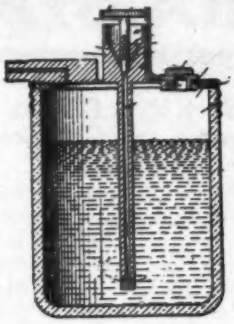


tank, and an oil and gas inlet pipe opens into the tank. A valve controls the gas outlet. There are connections between the float and the gas outlet valve for the purpose of closing the latter as the level of the oil rises and lifts the float. A valve also controls the oil outlet. A rod extends vertically through the float, along which the float is vertically guided. There is another vertically extending guide rod outside the float. There is a means on the float which slidably engages the second guide rod and thereby holds the float from rotating on the first guide rod.

Apparatus for Moistening Carbureted Mixtures for Gas Engines

Patent No. 1,329,252; described in Patent Office *Gazette*, Jan. 27, 1920. William Millard, New York, N. Y., assignor to Carbon Destroyer Corporation, New York, N. Y., a Corporation of New York. Filed Nov. 21, 1917. Serial No. 203,290. 1 Claim (Cl. 261—121.)

This is a unitary air-moistening device comprising a reservoir adapted to contain liquid and air. Formed directly in and by one of its walls is a passage which is intermediate to the lower portion of its interior and the atmosphere

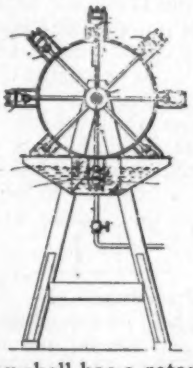


A valve is applied directly to and carried by the wall of the reservoir. It is this valve that controls the flow of air through the passage into the lower portion of the reservoir. A conduit is carried by one wall of the reservoir, in communication with the upper portion of the interior thereof, and is capable of direct connection to a conduit for carbureted air.

Apparatus for Testing Gas Leakage

Patent No. 1,329,160; described in Patent Office *Gazette*, Jan. 27, 1920, page 556. George W. Christians, Brooklyn, N. Y., assignor to Thomas E. Murray, New York, N. Y. Filed July 30, 1918. Serial No. 247,465. 2 Claims. (Cl. 73—51.)

This apparatus for testing perviousness to gas leakage of a gas-

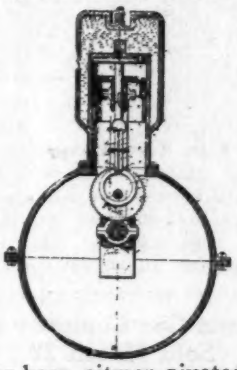


confining shell has a rotary hub on which there are tubular spokes supporting at their outer ends and conveying gas under pressure to the shells to be tested. A tank for containing liquid is so placed to receive each shell in turn during the rotation of the hub. There is a means for removably securing the shells in line with and upon the ends of the spokes. This securing means comprises a circular band which connects the spokes. A pair of standards is secured on the band on opposite sides of each of these spokes, securing the shell between them. There is also a means, supported by the standards, for clamping the shells against the ends of the spokes.

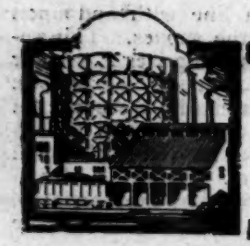
Internal Combustion Engine

Patent No. 1,326,733; described in Patent Office *Gazette*, Dec. 30, 1919, page 819. John Otto Hulse, Flint, Mich. Filed May 2, 1919. Serial No. 204,139. 6 Claims. (Cl. 123—78.)

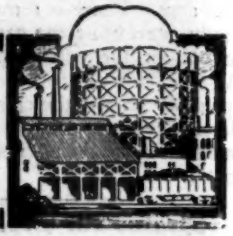
This is an internal combustion engine with a cylinder and inlet and exhaust valves for the cylinder. There is a hollow piston mounted so as to reciprocate within the cylinder. It has an interior



tubular boss, pitmen pivoted within it upon opposite sides of the tubular boss. A crank shaft, having a wrist pin, is pivotally connected with the pitmen. A subpiston is mounted to reciprocate within the cylinder above the hollow piston, and has a connection with a rod that is slidable within the tubular boss. This rod is provided with a curved groove. An element, secured to the tubular boss, projects into the curved groove. A coacting rod, pivotally connected with the first-named rod, turns upon its longitudinal axis with relation thereto. A large gear is ranged between the pitmen and is pivotally connected therewith. Eccentrics are arranged upon the opposite sides of the large gear and secured thereto to rotate with them. Eccentric straps are carried by the eccentrics. The pitmen have pivotal connection with the eccentric straps and the coacting rod. A small gear is carried by the wrist pin and engages the large gear.



NEWS OF THE GAS INDUSTRY



Public Urged to Attend Natural Gas Convention

The annual convention of the Natural Gas Association of America and the Association of Natural Gas Supply Men, which will be held in the city of Buffalo, N. Y., from May 17 to 20, will not only be open to the public but the public will be urged by every possible means to attend, that they may become intelligently acquainted with some of the problems confronting the natural gas industry. The people at large, always having had the benefits accruing from the use of natural gas at a price which put a premium upon waste, never have become interested in means of saving this fuel until brought face to face with the fact that it soon would have to be replaced by fuel several times higher in actual cost.

Staunton Gas Company to Be Sold March 22

Sale of the entire plant, distributing system and franchise of the Staunton Gas Company, under terms aiming to protect both the stock and bond holders of the company and the public, and assuring the improvement of the plant, has been ordered in a decree handed down by Judge R. S. Ker in the corporation court. Charles S. Hunter and H. H. Kerr were appointed special commissioners to effect the sale on March 22 on the courthouse steps.

Judge Ker's action followed a report by the gas company receiver, Charles S. Hunter, to the effect that the gas plant is being operated at a loss and beyond its rated capacity, and that the Mandeville interests of Philadelphia, owners of the majority stock, have refused to furnish funds for necessary improvements. Arguments in the case were heard, and Judge Ker's decree ordering the sale was entered for record a few hours after the hearing. The decree covers nine typewritten pages.

New York P. S. C. Asks Preference for Gas Coal Shipments

The New York Public Service Commission, Second District, has asked the United States Railroad Administration to provide for proper transmission of gas coal consigned from mines to gas manufacturing companies in the State of New York. The commission asked that these shipments have preference in transit. The Director-General was notified that partial shutdowns of plants have occurred, with inconvenience to the consumers.

Motor Company Enters Gas Business

Will Sell 6,000,000 Cu. Ft. Daily By-Product of Its Pig Iron Blast Furnaces

The Miami Motor Company, of Chicago, has announced that it will actively take up the installation in Muskegon, Ill., of pig iron blast furnaces, which will put out over 500 tons of metal daily for the use of all of the local foundries.

As a by-product the concern will manufacture 11,000,000 cu. ft. of gas a day. Of this amount 5,000,000 will be used to operate the plant, leaving 6,000,000 ft. to be offered to the city of Muskegon, Ill.

The concern will commence immediately the building of a $500,000 plant on the shores of Lake Muskegon, and is expected to expand for the first year to a plant worth over $20,000,000.

THE PITTSFIELD (N. H.) GAS COMPANY held its annual meeting on Jan. 20, and elected the following directors: Nathaniel S. Drake, William A. Goss, Hiram T. Folsom, Charles N. Batchelder, Frank H. Sargent, Herbert B. Fischer and Herbert W. Dustin. At the meeting of the directors Charles N. Batchelder was elected president, Nathaniel S. Drake, clerk and auditor; Bernard A. Louges, superintendent.

Director of U. S. Bureau of Mines Says Use of Gas and Coke Only Means to Banish Smoke

The householder is to blame for the smoke nuisance in our large cities, according to Dr. Van H. Manning, director of the United States Bureau of Mines, who recently declared that smoke can be banished only by the use of coke and gas for heating and cooking.

Each year, said Dr. Manning, smoke causes property damage estimated at from $12 to $20 for each city dweller in the United States. In large cities where soft coal is burned for domestic heating about 60 per cent of all the smoke in the atmosphere is made in the residential section in househeating furnaces. To eliminate this nuisance and to make the city a pleasanter place to live in and enjoy the good health that goes with a pure, wholesome atmosphere, the Bureau of Mines urges that coke and gas be substituted for soft coal.

Gas Men Wreck Telephone Cables Looking for Leak

Employees of the Boston (Mass.) Consolidated Gas Light Company in Dorchester, at 2 o'clock in the morning, dug into the ice at the corner of two intersecting streets to locate a gas leak.

A huge crowbar was used to bore a hole through the ice and into the ground, but before the leak was located 400 pairs of cables, property of the New England Telephone & Telegraph Company were put out of commission, resulting in a serious interruption to the telephone service in many local exchanges.

The crowbar was firmly wedged in the ground, when two men started an anvil chorus with big sledge hammers, sending the iron bar with each blow further into the ground.

It went down so deep that it entered a telephone conduit and was imbedded in the cable box, disabling cables and curtailing local service.

Pacific Coast Gas Association Doings

Progress is Reported on the Lowering of B. T. U. Standard at Get-Together Dinner in San Francisco—Investigation Papers in Course of Preparation for Convention at Portland in September

By FREDERICK S. MYRTLE

Members of the Pacific Gas Association met at their first get-together dinner of the present season on the evening of Saturday, Feb. 14, at the Commercial Club in San Francisco.

There was an excellent attendance and the evening was really worth while from every point of view. President A. B. Day came up from Los Angeles to preside and brought with him J. T. Creighton, also of the Los Angeles Gas & Electric Corporation. At the speakers' table were placed three of the "old guard"; namely, E. C. Jones, John Clements and George D. Roper, the last-named a charter member of the association who for many years past has presided over the destinies of the Eclipse Stove Company in far-away Rockford, Ill. Others at the table were former President John D. Kuster, of San Jose; Henry Bostwick, the active and energetic secretary of the association; Leon B. Jones, vice-president of the association; C. B. Babcock, chairman of the committee on papers and meetings; F. S. Myrtle, chairman of the publicity committee, and, last but by no means least, L. S. Ready, chief engineer of the California State Railroad Commission and chairman of the Railroad Commission's Joint Committee on the Efficiency and Economy of Gas, appointed as a result of the open discussion of the B.t.u. question at the Los Angeles convention last September.

During dinner some enjoyable entertainment was furnished by the committee appointed for the purpose. Miss Louise Jorgensen pleased the audience in some dainty dances, while Miss Marie Grant entertained with charming vocal selections. A new acquisition in the story-telling line was discovered in Frank Thompson, of the industrial department of "Pacific Service," who reeled off some dialect stuff in truly professional style.

At the conclusion of dinner the chairman called for reports from the various committees, the most important of these being that of the Railroad Commission's committee, headed by L. S. Ready, which was, of course, presented by that gentleman in person.

B.t.u. Content Committee

Mr. Ready told his hearers of the events that preceded the appointment of his committee. At the convention before referred to the subject of the B.t.u. content of gas had been brought up for general discussion and it was the consensus of opinion that a committee should be appointed to go into the subject thoroughly. As a result, President Day had appointed a number of members to serve on a committee to be known as the B.t.u. Content Committee. This committee was headed by F. S. Wade, of Los Angeles, the other members being E. C. Jones and C. B. Babcock, of San Francisco; F. J. Schafer and J. T. Creighton, of Los Angeles; L. M. Klauber, of San Diego, and D. J. Young, of Tacoma, Wash. The matter having been taken up with the gas and electric department of the Railroad Commission, that body had engaged to undertake a thorough investigation, and with that end in view had appointed a committee to be known as the Joint Committee on Efficiency and Economy of Gas. On this Chairman Ready is supported by G. S. Jacobs and E. S. Bryant, both of the engineering department of the Railroad Commission, in their respective capacities of treasurer and secretary, and the following appointed to represent the various gas companies interested in the question: Pacific Gas & Electric Company, Willis S. Yard, recently appointed superintendent of gas operations for the Pacific Gas & Electric Company, and W. M. Henderson; Los Angeles Gas & Electric Corporation, A. B. Day and J. T. Creighton; Southern California Gas Company, F. J. Schafer and B. G. Williams; Southern Counties Gas Company, F. S. Wade and Fred Champion; San Diego Consolidated Gas & Electric Corporation, L. M. Klauber; Western States Gas & Electric Company, James E. Kelley; Pacific Coast Gas Association, F. S. Wade and C. B. Babcock.

570 B.t.u. Standard Until Investigation Committee Can Arrive at Lower One

Mr. Ready reported that the investigation was one likely to take from one to two years before a definite determination on this B.t.u. question could be reached in determining the best quality of gas for manufacture and distribution to the consumer and the best for the consumer to use. All conditions of operation and distribution must be taken into consideration, and it had been decided to make practical tests at certain plants designated as the best available for the purpose. So far the plants chosen were the San Jose gas plant of the Pacific Gas & Electric Company and the Santa Barbara gas plant of the Southern Counties Gas Company. It was a matter of common knowledge, of course, that the Railroad Commission had, for the present, fixed the standard of gas to be manufactured and distributed to consumers at 570 B.t.u., but the commission was perfectly willing to be "shown" on this very important matter, and not only would these tests be made but all possible evidence be taken, so that it might be found in the final analysis that the most efficient standard of gas for general distribution would be upon a thermal unit content basis below the standard mentioned.

All of the "old guard" members present were called upon for remarks. Mr. Roper announced himself to be one of six left of the original forty-six charter members of the association. Twenty-seven years ago he had left for the East, and he asked his hearers to believe that he owed the initial steps upon which he had built the foundation of his successful business to his membership in the P. C. G. A. He left with us a message, suggested, as he said, by some thoughts and quotations issued by the H. L. Doherty Companies in their calendar for the year 1920. His message was this:

"When workmen learn that wages come from production and not from capital, a long step forward will have been taken."

John Clements, with the delightful experience of his seventy-fifth birthday celebration still fresh in his mind, spoke as none but he could speak upon "Experience."

E. C. Jones Announces That He Will Devote His Energies to Expansion of the Industry

Another important speaker on the program was E. C. Jones, who in a few pleasant remarks announced his intention of actively pursuing the gas business as a consulting engineer and devoting his energies to the expansion of the gas industry in every branch. He told his audience that the gas men on the Coast were not delivering 10 per cent of the needs of the gas business, and he thought every effort should be made to make the public realize the value of the commodity at their disposal and the diversified uses to which it could be applied.

Papers in Preparation for Pacific Association Convention

It was announced at the dinner that the next get-together meeting would be in Los Angeles some time in June. Meanwhile preparations were under way for the annual convention, to be held this year in Portland, Ore., and Mr. Babcock announced the following list of papers selected for the occasion:

"Production, Transmission and Distribution of Natural Gas," by A. B. McBeth, vice-president and general manager of the Southern California Gas Company, Los Angeles.

"The Use of Governors and Regulators in Gas Distribution," by W. M. Henderson, superintendent gas distribution, Pacific Gas & Electric Company, San Francisco.

"Advantages of Gas Fuel in the Heat Treatment of Metals," by R. G. Logue, superintendent, Beacon Light Company, Los Angeles.

"Policy of the Management in the Sale of Gas," by D. J. Young, vice-president and general manager, Tacoma Gas & Fuel Company, Tacoma, Wash.

"Oil Gas," by Leon Jones, consulting engineer, San Francisco.

Other papers are under consideration and announcement in detail will be made at a later date.

Committees and Committeemen Appointed

President Day announced the completion of his organization for the present year. Following are the committees appointed:

Wrinkle Department — F. H. Bivens, Santa Barbara, editor; C. B. Babcock, San Francisco; D. J. Young, Tacoma, Wash.; F. J. Schafer, Los Angeles.

Experience Department — John Clements, Oakland, editor.

Publicity Department — F. S. Myrtle, San Francisco, editor; H. J. Kister, Los Angeles; John H. Hartog, Portland, Ore.

Library—W. M. Henderson, librarian.

Gas Engineering Degree Committee—John A. Britton, San Francisco, chairman; E. C. Jones, San Francisco; L. P. Lowe, San Francisco; C. L. Cory, San Francisco.

Gas Exhibits Committee—M. S. Barnett, San Francisco, chairman; Tom Leary, San Francisco; J. P. Davidson, San Francisco; J. E. Moore, San Francisco; Paul E. Haugh, Los Angeles; William Kapus, Portland, Ore.

Public Policy Committee—C. O. G. Miller, San Francisco, chairman; William Baurhyte, Los Angeles; H. M. Papst, Portland, Ore.; John A. Britton, San Francisco.

Legislation and Taxation Committee—Paul Overton, Los Angeles, chairman; C. P. Cutter, San Francisco; D. J. Young, Tacoma, Wash.

Committee on Piping of Buildings for Gas—H. M. Crawford, San Francisco, chairman; D. J. Young, Tacoma, Wash.; E. L. Hall, Portland, Ore.; Thomas J. Protheroe, Los Angeles; W. M. Henderson, San Francisco.

Committee on Papers and Meetings—C. B. Babcock, San Francisco, chairman; W. M. Henderson, San Francisco; H. C. Ross, Fresno; Dwight W. Jones, San Francisco; G. D. Mantle, Oakland.

Entertainment and Reception Committee—Guy W. Talbot, Portland, Ore., chairman; C. F. Adams, Portland, Ore.; W. M. Kapus, Portland, Ore.; W. H. Barton, Portland, Ore.; Harry Warner, Spokane, Wash.; W. W. Flanders, Tacoma, Wash.; F. K. Lane, Seattle, Wash.; John Keeler, Vancouver, B. C.; Hilmar Papst, Portland, Ore.

Committee on Technical Information—E. L. Hall, Portland, Ore., chairman; D. J. Young, Tacoma, Wash.; W. M. Henderson, San Francisco; C. B. Babcock, San Francisco; F. S. Wade, Los Angeles; B. S. Pedersen, San Francisco; H. R. Basford, San Francisco; H. M. Crawford, San Francisco.

Membership Committee—Northern Section: W. M. Kapus, Portland, Ore., chairman; W. M. Duggan, Portland, Ore.; George L. Myers, Portland, Ore.; W. W. Flanders, Tacoma, Wash.; W. D. Conner, Seattle, Wash. Central Section: George P. Egleston, San Francisco, chairman; M. S. Barnett, San Francisco; C. B. Babcock, San Francisco; John D. Kuster, San Jose; Van E. Britton, Oakland; Harry Jackson, San Francisco; J. P. Davidson, San Francisco; H. C. Ross, Fresno; W. J. Armstrong, Oakland; A. E. Caldwell, San Jose; Frank Cannon, Honolulu, T. H.; J. R. Bearwald, San Francisco; L. F. Galbraith, San Francisco; Ross Munro, Oakland; G. D. Mantle, Oakland. Southern Section: C. M. Grow, Los Angeles, chairman; Frank Weiss, Los Angeles; Frank C. Packer, San Francisco; Frank A. Easton, Bakersfield; J. E. Sommers, Long Beach.

Committee on Affiliation with the American Gas Association—W. E. Houghton, Los Angeles, accounting; W. H. Barton, Portland, Ore., commercial; C. B. Babcock, San Francisco, manufacturing; E. C. Jones, San Francisco, technical; G. D. Mantle, Oakland, advertising.

Purpose of Technical Committee

Concerning the Committee on Technical Information, Secretary Bostwick has addressed a circular letter to the membership calling attention to this committee and containing the following advice:

"The purpose of the Committee on Technical Information is to give out information upon request to the smaller member companies who have not or cannot afford to hire high-class technical help. All members desiring any information or assistance along these lines will initially take up the matter direct with Mr. Hall, who in turn will transmit the same to the member of his committee to whom he has delegated the subject matter.

"It is up to the members of the association to take advantage of the opportunities which our Committee on Technical Information is placing at their disposal under the leadership of Mr. Hall."

Fire at Plant of Winston-Salem Company

Flames that leaped to a height of more than 50 ft. and appeared to endanger an entire congested area adjacent to the gas works partially destroyed the Winston-Salem (N. C.) Gas Company plant. In the face of a deadly heat that penetrated the night air for several yards, firemen fought the conflagration in a manner worthy of praise for more than three-quarters of an hour, during which time an explosion of chemicals or gases was feared.

During the turmoil and confusion that began with the outbreak of fire and lasted until well after midnight it was impossible to get accurate information concerning the fire's origin. According to statements of a negro operative, the fire started when a leaking pipe became ignited. Seized with panic, he poured a bucket of water over the burning fluid, causing the leaping flames to travel toward a 50-gal. tank of gasoline. An explosion followed quickly, tearing to pieces the huge gasoline tank. As the fluid flowed in every direction the fire scattered, and within ten minutes the entire two-story structure was aflame.

It appeared for many minutes that the conflagration would touch the main gas tank. Due to preventive measures, however, the gas company had made such an accident impossible by protecting the gas with water on all sides.

The damage will run to several thousand dollars, since much of the machinery used in the manufacture of gas was destroyed.

Although the service was crippled badly, the people of Winston-Salem were able to get gas the next day, according to an official of the gas company.

Saugerties Company Gets Grant

At the meeting of the town board of Saugerties, N. Y., a resolution was unanimously adopted that the Saugerties Gas Light Company be granted the right to lay and maintain conductors for conducting gas through the streets, lanes, alleys, squares and highways of the town of Saugerties, Ulster County, New York, for the purpose of supplying its public and private customers with gas and under such reasonable regulations.

Construction Notes

Jefferson City Co. to Make $15,000 Improvements

H. F. Kelly, manager of the Jefferson City (Mo.) Light, Heat & Power Company, announces that work is to begin soon on the installation of modern, new gas mains over the entire city to cost from $12,000 to $15,000.

Ludington Co. Will Enlarge Feed Mains and Build Holder

The Ludington (Mich.) Gas Company has asked the Michigan Public Utilities Commission for permission to issue $40,000 of preferred stock bearing 10 per cent interest. Feed mains will be enlarged and a 100,000-ft. gas retainer installed.

Central States Co. Will Install Water Gas Apparatus

A new 6-ft. water gas set will be installed in the plant of the Central States Gas Company at Vincennes, Ind., by the Gas Machinery Company, of Cleveland, Ohio. This plant will be located in one end of the retort house, and will include condenser and auxiliary equipment.

Jefferson City Co. Will Spend $10,000 in Mains

Announcement has been made by Manager Kilby, of the Jefferson City (Mo.) Light, Heat & Power Company that the capacity of the gas plant will be increased 25 per cent this summer.

He stated that it is the intention of the company to expend about $10,000 in laying mains.

Indianapolis Co. Laid 33,192 Ft. of Mains

The Indianapolis Gas Company installed 33,192 ft. of gas mains during 1919, according to the annual report submitted to the Board of Works by J. D. Torresh, secretary and general manager.

During the year a total of 41,535 ft. were ordered, leaving a margin of 6,197 ft. yet to be completed. The estimated number of feet to be installed this year is 32,291 and for improvement of service 30,000.

Nebraska Company Has Under Way Water Gas Installation

A new 5-ft. set will be installed in the works of the North Platte (Neb.) Light & Power Company. This set will be located in position that was reserved for same when the Gas Machinery Company built a complete plant in North Platte several years ago. It will be located alongside of the old 4-ft. set.

Chicago Company Announces Its Building Plans

The Peoples Gas Light & Coke Company, of Chicago, Ill., has announced its plan for erecting a new gas plant in Chicago at a cost to approximate $18,000,000. The plan has been ratified by stockholders at their annual meeting. It will take about two years to build the plant, whose capacity will be 30,000,000 cu. ft. of gas daily and will effect a saving of $1,000,000 a year to the gas company.

The Peoples Gas Light & Coke Co. is utterly unable to finance the new project under present conditions. Consequently, an allied corporation, to be known as the Chicago By-Products Coke Company, is to be formed, having a capital stock of $4,500,000 and bonds to aggregate $13,600,000. This company will build and operate the plants.

The Koppers Company, of Pittsburgh, Pa., will do the actual construction. This company and the Peoples company jointly will guarantee the bonds and the gas company will sign a twenty-five-year contract to take all the gas produced by the new concern.

The bonds of the by-products company will be retired by a sinking fund taken from earnings within twenty years, and the stock of the company will be bought in largely through an option of the Peoples company, which allows the purchase at any time after four years from the beginning of the plant's operation of both the stock and the bonds. This means that eventually the new plants will become the property of the Peoples company. They are to be erected on the drainage canal. The Peoples company sold ten acres for $600,000 for that purpose.

At the annual meeting all the retiring directors of the Peoples Gas Light & Coke Company were re-elected.

Personal Notes

Lewis Brown Gawtry Resigns Executive Posts

Lewis Brown Gawtry, senior vice-president of the Consolidated Gas Company of New York, resigned that office and as secretary of various New York gas and electric companies, Feb. 26, after twenty-five years of service with the company.

Mr. Gawtry is the son of Harrison E. Gawtry, who was a prime mover in the organization of the Consolidated Gas Company, its first president, and later, until shortly before his death, Jan. 29, 1919, chairman of the executive committee.

Lewis Brown Gawtry has been very active in the welfare work of the New York companies, being the organizer, among other works, of the large orchestra of the meter repair shop and the Boy Scouts organization of the younger employees of the gas companies.

He is a member of the Union University, the Union League and Riding clubs, president of the Manhattan Council of the Boy Scouts of America and a member of the Sons of the American Revolution.

With his resignation from the Consolidated he retains his various directorships and becomes first vice-president of the Bank for Savings in the City of New York, the oldest savings bank in the country, founded in 1819, and the third wealthiest in the United States. He will take a very active part in its direction.

W. W. Kemp and W. H. Van Horn Awarded Medal by Franklin Institute

On Feb. 18 the Franklin Institute awarded the Edward Longstreth Medal of Merit to W. Wallace Kemp and William H. Van Horn for their invention embodying the Kemp system.

Ruud Mfg. Co., Held Five-Day Convention of Sales Force

The latter part of January the Ruud Manufacturing Company held a general sales convention at the William Penn Hotel, Pittsburgh, Pa. Representatives of the company from every section of the country were there for five days. This convention was a success in every way and was one of the largest water heater manufacturer's convention that has ever been held.

THE RUUD SALES FORCE AT THE CONVENTION BANQUET HELD AT THE WILLIAM PENN HOTEL IN PITTSBURGH

Every important city in the United States had a delegation at the convention, the farthest points being represented by Otto Neisser, of Los Angeles, Cal.; H. R. Basford, of San Francisco, Cal.; J. C. Dyer, of Jacksonville, Fla., and W. T. Pease, of Boston, Mass.

Every phase of the sales problem was given attention at the convention; the 1920 schedule of advertising was explained and a visit to the factory made. The relation of the export activities of the company to the general post-war world-wide trade expansion on the part of American manufacturers was discussed.

Local Manager of Empire Gas & Electric Co. Promoted

William J. Callanan, who has been local manager of the Empire Gas & Electric Company, in Palmyra, N. Y., since August, 1913, received his official transfer from Newark to Auburn, N. Y. The change will become effective March 1, when Mr. Callanan will take up his duties in Auburn. The transfer is a promotion and affords Mr. Callanan greater responsibilities and greater opportunities.

Mr. Callanan is a graduate of the Gas Educational School of New York City, which is a technical institution maintained by the gas companies of the State.

The successor of Mr. Callanan is Gordon Myers, who has been manager of the Seneca Falls plant.

S. Smith Appointed Sales Manager

Charles Otten, Jr., manager of the Plymouth (Mass.) Gas Light Company, announces that he has added S. Smith to his organization as sales manager. Mr. Smith has been connected with gas companies both in New England and in other States.

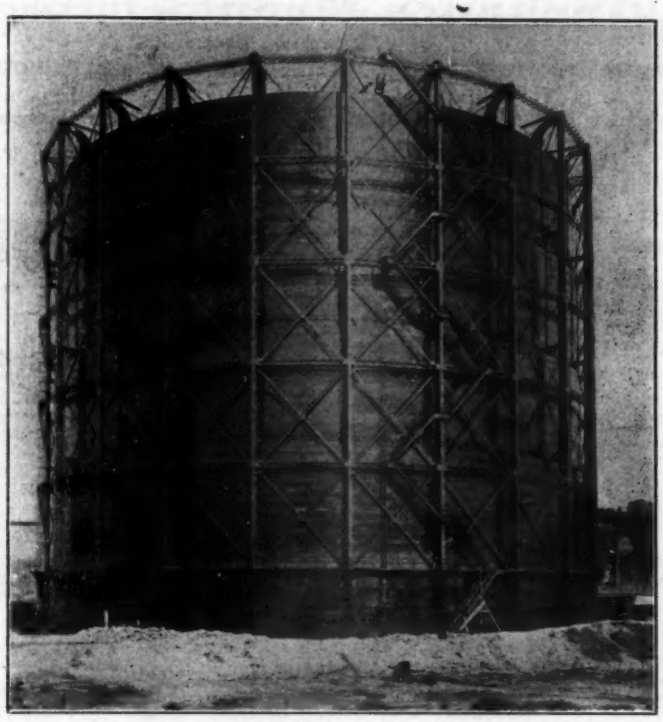
C. B. Strohn Elected Vice-President of Western United Co.

At a directors' meeting of the Western United Gas & Electric Company Clarence B. Strohn, of Elgin, Ill., who has been district manager for the Western United Gas & Electric Company, was elected vice-president of the Western United Gas & Electric Company to succeed his brother, the late R. N. Strohn. Miss Helen O'Meara, auditor of the Western United, was elected treasurer of the company, succeeding to the duties formerly carried on by the late Mr. Strohn.

RITER-CONLEY CO.

PITTSBURGH, PA.

PURIFYING BOXES



STEEL TANKS

BUILDERS OF

TWENTY YEARS EXPERIENCE **GAS HOLDERS** HAS TAUGHT US HOW

STEEL CONSTRUCTION OF ALL KINDS

Philadelphia	Pottstown	Detroit	Chicago	Cincinnati
Washington	New York	Boston	Syracuse	San Francisco

You adopt improved machinery and systems. Why not use better meters,

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Although standard type, are built stronger and embody many improvements that assure Better Service.

Write for illustrated Booklets and get our quotations. They will interest you.

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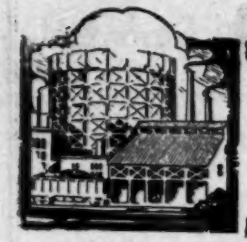
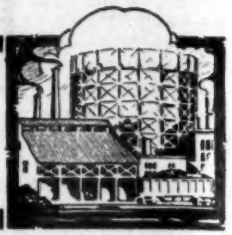


With The Equipment & Appliance Manufacturers



Conducted by Business Department of American Gas Engineering Journal

Bulletin on Improved Method of Utilizing Gas for Industrial Purposes

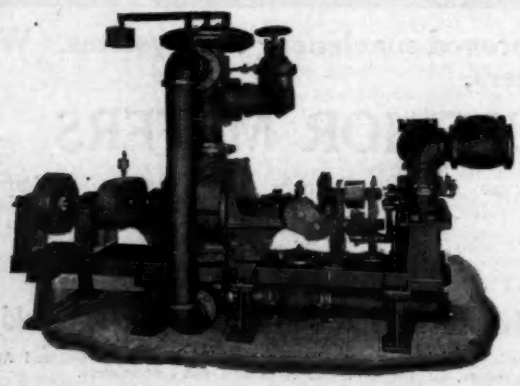
The C. M. Kemp Manufacturing Company, Baltimore, Md., in a recent bulletin on the "Kemp Automatic Gas System," give valuable data to the gas man on this improved method of utilizing gas for factory fuel purposes. This system can be used in such a variety of industries that practically every gas company has a number of live prospective users in their territory. They state that installations have been made for applying fuel to furnaces, crucibles, ovens, for soldering, brazing, tempering, welding, cloth and yarn singeing, heating plate singers, laundry machinery, tin can making, institutional cooking, chemical laboratory and domestic science, all at a considerable saving of gas consumption.

By this system the gas and air automatically mixes in predetermined ratio, in exact amount to supply the current demand, and are compressed to pressures to meet the demands of the work.

The machine is small and can be located in the basement or on any floor of the building, and requires no more power than the ordinary fan or blower.

The bulletin contains a number of illustrations of installations, sectional views of the machine, as well as operating parts.

This bulletin will be sent to any gas company on request.



KEMP AUTOMATIC GAS SYSTEM

Swivel Casters for Charging Barrows

An announcement to the trade has just been issued by the Akron Cultivator & Manufacturing Company, of Akron, Ohio, to the effect that it is now equipped to furnish swivel casters for all of its charging barrows. This includes both the charging barrows on order and many thousands already in the field.

The casters are made adjustable to any size or type of charging barrow now in use and the only tools required for attaching them are two ordinary wrenches.

"The advantages of swivel casters for charging barrows are almost too obvious to necessitate description," according to the announcement sent out by R. R. Roemer, general manager of the Akron Cultivator & Manufacturing Company. "No matter how heavy the load, the barrow equipped with our casters can be easily and quickly moved from place to place.

"We had hoped to make a general announcement of this feature some time ago, but the demand for the limited quantities we were already turning out was vastly greater than we could take care of. Therefore, the announcement was deferred until the installation of new and extensive equipment. The equipment is in and we are now in excellent position to take care of the thousands of requests that have come in from the outside territory as well as our own requirements for the regular output."

AKRON BELL BOTTOM CHARGING BARROW

Announcement

The Mono Corporation of America, Buffalo, N. Y., announce that they have purchased the entire stock of Mono apparatus and accessories from the F. D. Harger Co., Buffalo, N. Y. This includes all rights for the manufacture and sale of their various types of Mono apparatus for the automatic analysis of CO_2, CO, O_2, H_2, SO_2, N_2, Cl, etc.

F. D. Harger, M.E., has not severed his connection, but will serve as general manager of the new corporation.